PRODUCT PACKAGING WITH LATCHING ENDCAP AND METHOD FOR LOADING

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates generally to improvements in the field of product packaging, and in particular to advantageous aspects of an improved product package with a latching end cap.

Description of the Prior Art

One type of product packaging that is currently in use includes a tube, or sleeve, having openings at both ends. The item to be packaged is loaded into the tube, and each end of the tube is sealed by inserting a closely fitting endcap into the opening. A number of different techniques have been developed to hold the endcaps in place, including glue, tape, staples, and the like. However, these techniques suffer from a number of drawbacks, including the amount of labor and materials required to construct the package, the esthetic appearance of the finished package, and the firmness of the attachment between the endcaps and the tube ends.

SUMMARY OF THE INVENTION

The above issues, and others, are addressed by the present invention, one aspect of which provides a container including a tube having a rim at one end defining an opening and an endcap including a channel that is shaped to receive the tube rim. The tube includes at least one latching aperture positioned such that when the tube rim is seated in the channel, the latching aperture is contained within the channel. The endcap further includes a latching member that engages the latching aperture when the tube rim

is seated in the receiving channel. The latching member includes a sloped surface for deflecting the tube rim to allow the tube rim to be slid into position over the latching member. The endcap further includes a first guide fin assembly on a first side of the latching member and a second guide fin assembly on a second side of the latching member. Each of the first and second guide fin assemblies includes a sloped surface shaped to deflect the tube rim in a direction opposite to the deflection of the tube rim by the latching member when the tube rim is slid into position in the channel, and to maintain the engagement of the latching aperture by the latching member when the tube rim is seated in the channel. A further aspect of the invention is directed to a method for packaging an item in a container having a tube and latching endcap.

Additional features and advantages of the present invention will become apparent by reference to the following detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows an exploded perspective view of a package according to a first aspect of the invention, including a tube and a pair of endcaps.

Fig. 2 shows a perspective view of the package shown in Fig. 1, in which the endcaps have been installed onto the tube, and in which the package has been rotated so that the upper endcap points towards the foreground and the lower endcap points towards the background.

Figs. 3, 4 and 5 show, respectively, elevation, top and side views of the package shown in Fig. 1.

Fig. 6 shows a bottom view of an upper endcap suitable for use in the package shown in Fig. 1.

Figs. 7 and 8 show, respectively, closeup bottom and top views of a portion of the endcap shown in Fig. 6.

Figs. 9 and 10 show interior perspective views of, respectively, the inner and outer walls of the portion of the endcap shown in Figs. 7 and 8.

Fig. 11 shows a cross section of the endcap shown in Fig. 6 through the plane 11-11.

Fig. 12 shows a cross section of the endcap shown in Fig. 6 through the plane 11-11, with the guide fins removed in order to more clearly illustrate the central latching member.

Fig. 13 shows a cross section of the endcap shown in Fig. 6 through the plane 13-13, with the central latching member removed in order to more clearly illustrate the guide fins.

Fig. 14 shows a cross section of a portion of the endcap shown in Fig. 6 and a portion of a tube to which the endcap is to be attached.

Fig. 15 shows a cross section of a portion of the endcap shown in Fig. 6 and a portion of a tube that has been attached to the endcap.

Figs. 16A-16C show a series of cross section diagrams illustrating the operation of the central latching member in attaching an endcap to a tube in accordance with an aspect of the invention.

Figs. 17A-17C show a series of cross section diagrams illustrating the operation of the guide fin assemblies in attaching an endcap to a tube in accordance with an aspect of the invention.

Figs. 18A and 18B show a pair of bottom diagrams illustrating the operation of the central latching member and guide fin assemblies in attaching an endcap to a tube in accordance with an aspect of the invention.

Fig. 19 shows a flowchart illustrating a method according to a further aspect of the invention for packaging an item.

DETAILED DESCRIPTION

An aspect of the present invention provides a product package including a tube having a rim defining an opening at one end thereof. The package further includes an endcap for closing the opening. As described in further detail below, there is formed in the endcap a channel that is shaped to closely receive the tube rim. The endcap includes at least one latching member contained within the channel that engages a latching aperture in the tube proximate to the rim when the tube rim is seated in the channel. The latching member holds the endcap securely in position. According to a further aspect of the invention, the latching member is designed to be relatively easy to engage but relatively difficult to release. Thus, it is relatively easy for a manufacturer to load the tube with a retail item and to latch the endcap into position. However, it is then relatively difficult for a retail customer to remove the endcap without visibly damaging the package.

As shown in the illustrative embodiments shown in the drawings and described herein, the tube has a rectangular profile. However, this profile is illustrative and, as used herein, the term "tube" is intended to cover other profiles as well. For example, a "tube" may also refer to a simple cylinder that is open at both ends, as well as tubular structures having other non-rectangular profiles, including elliptical, polygonal, and irregular

profiles, as well as structures that are open at only one end. If the tube is fabricated from plastic, a desired profile may be created, for example, by using scoring, thermoforming, or other suitable techniques, or a combination of shaping and construction techniques.

Fig. 1 shows an exploded perspective view of a package 10 according to a first aspect of the invention. The package 10 includes a tube 20, a top endcap 40, and a bottom endcap 80. The tube 20 has a rectangular profile. However, as discussed above, the tube may have other profiles without departing from the spirit of the invention. The tube 20 further includes an upper rim 22 defining an upper opening 24, and a lower rim 26 defining a lower opening 28. It is noted that it would be possible for the present invention to be practiced with a tube 20 having only a single opening. It would also be possible to practice the present invention to close a tube at one tube opening while using a different technique to close the other tube opening. For example, it may be desired to make one endcap releasable and to make the other endcap non-releasable.

As shown in Fig. 1, the sleeve 20 has a set of upper latching apertures 30 proximate to the upper rim 22 and a set of lower latching apertures 32 proximate to the lower rim 26. As described below, the upper latching apertures 30 are used to latch the upper endcap 40 in position when it is seated so as to cover the upper tube opening 24 and the lower latching apertures 32 are used to latch the lower endcap 80 when it is seated so as to cover the lower opening 28. In Fig. 1, the latching apertures 30 and 32 are illustrated as having a rectangular shape. However, other shapes may be used without departing from the spirit of the invention. The number and location of the latching apertures 30 and 32 may also be varied without departing from the spirit of the invention.

As shown in Fig. 1, the lower endcap 80 includes a receiving channel 81 that is shaped to closely receive the lower rim 26. The upper endcap 40 also includes a receiving channel 42, not seen in Fig. 1 but illustrated in Fig. 6, discussed below, that is shaped to closely receive the upper rim 22. As shown in Fig. 1, the upper endcap 40 and lower endcap 80 are substantially identical in shape. However, differently shaped upper and lower endcaps 40 and 80 may be used without departing from the spirit of the invention. As discussed below, the upper and lower endcaps 40 and 80 include a plurality of latching assemblies that engage the latching apertures 30 and 32 to latch the endcaps 40 and 80 into position when they are properly seated on the ends of the tube 20.

Fig. 2 shows a perspective view of the package 10 shown in Fig. 1. The top and bottom endcaps 40 and 80 have been locked into position at the top and bottom ends of the tube 20, and the package 10 has been rotated so that the top endcap 40 is facing rearward and the front endcap 80 is facing forward. As shown in Fig. 2, in the sealed package, the sleeve latching apertures 30 and 32 shown in Fig. 1 are completely hidden by the endcaps 40 and 80. As discussed above, the endcaps 40 and 80 are designed to be non-releasable. Thus, the package 10 cannot be opened without causing visible damage to the package 10. If desired, the package 10 may include structural elements to facilitate the opening of the package 10. For example, the tube 20 may include score lines or perforations to allow the tube 20 to be torn open. Also, one or both endcaps 40 and 80 may also be provided with an openable panel, tearaway strip, or other arrangement. As further discussed above, it would also be possible, within the spirit of the invention, for one of the endcaps to be releasable and for the other endcap to be non-releasable.

Figs. 3, 4 and 5 show, respectively, elevation, top, and side views of the package 10 shown in Figs. 1 and 2. Figs. 3 and 5 illustrate, using broken lines, upper latching assemblies 42 and lower latching assemblies 82. As shown in Figs. 1 and 2, the latching assemblies 42 and 82 are normally not visible in the finished package 10. It will be seen that the upper and lower endcap latching mechanisms 42 and 82 correspond in position to the upper and lower latching apertures 30 and 32 on sleeve 20 shown in Fig. 1. Each upper latching mechanism 42 includes a central latching member 44 straddled by first and second guide fin assemblies 46 and 48. Similarly, each lower latching mechanism 82 includes a central latching member 84 straddled by guide fin assemblies 86 and 88.

Fig. 6 shows a bottom view of the upper endcap 40, illustrating channel 41, which is used to receive the upper tube rim 22. Fig. 6 further illustrates the location of the latching assemblies 42, which are used to engage corresponding latching apertures 30 proximate to the upper tube rim 22. Fig. 7 shows a closeup bottom view of a single latching mechanism 24. As shown in Figs. 6 and 7, each latching assembly 42 includes three sections: a central latching section 44, a first guide fin assembly 46, and a second guide fin assembly 48. The first and second guide fin assemblies 46 and 48 straddle the central latching section 44.

As shown in Figs. 6 and 7, the upper endcap 40 includes an inner wall 50 and an outer wall 52 defining the receiving channel 41. Fig. 8 shows a top view of the latching mechanism 24 shown in Fig. 7. The inner wall 50 and outer wall 52 are supported by an upper wall 54 that is substantially perpendicular to the inner and outer walls 50 and 52. As shown in Fig. 8, the upper wall 54 includes a rectangular aperture 56 that is located over the central latching member 44. The rectangular aperture 56 serves a number of

different purposes. First, the aperture 56 facilitates the use of an injection molding process to form the upper endcap 40 and latching mechanisms 42. In addition, a suitably shaped tool may be inserted into the aperture 56 to release the latching mechanism without damaging the package 10.

It should be noted that the elements of the latching assembly 42 may be rearranged without departing from the spirit of the invention. For example, it would be possible to form the latching member 46 on the outer wall 52 of the upper endcap 40, and to form the guide fin assemblies 46 and 48 on the inner wall 50.

Fig. 9 shows an interior perspective view of the endcap inner wall 50, and Fig. 10 shows an interior perspective view of the endcap outer wall 52. In Figs. 9 and 10, the foreground corresponds to the bottom of the upper endcap 40 and the background corresponds to the top of the upper endcap 40. As shown in Fig. 9, the central latching member 44 protrudes from the inner wall 50 into the endcap channel. As shown in Fig. 10, the first and second guide fin assemblies 46 and 48 include a respective set of three guide fins 46a-c and 48a-c that protrude from the outer wall 52 into the endcap channel. The first and second sets of guide fins 46a-c and 48a-c are positioned such that they straddle the central latching member 44. The inner wall 50 further includes a pair of indentations 54 and 56 opposite, respectively, the first and second set of guiding fins 46a-c and 48a-c.

As shown in Fig. 9, the latching member includes a curved guide surface 62 that terminates sharply at a latching surface 64 that is substantially perpendicular to the inner wall 50. Returning to Fig. 1, the tube 20 includes a number of latching apertures 30. The latching apertures 30 are positioned such that each latching aperture 30 is aligned with a

corresponding latching member 44 of a corresponding latching mechanism 42. The curved guide surface 62 is shaped such that when the tube's upper rim 22 is inserted into the receiving channel 41 of the upper endcap 40, the portion of the tube rim 22 above each latching aperture is deflected outward to allow the upper rim 24 to clear the latching member. Returning to Fig. 1, this portion of the upper rim 24 is referred to as a "latching strip" 31.

When each latching aperture 30 is positioned over its respective latching member, the resiliency of the material used to fabricate the tube 20 causes the latching strip 31 to return towards the inner wall 50. The latching strip 31 engages the latching edge 64 of the latching member 44, preventing the tube 20 from being pulled free of the endcap 40.

Fig. 11 shows a cross section of the upper endcap through plane 11-11 of Fig. 6. Fig. 12 shows a cross section of the upper endcap through plane 13-13 of Fig. 6 with the guide fin assembly 46 removed to more clearly illustrate the central latching member 44. Fig. 13 shows a cross section of the upper endcap with the central latching member 44 removed to more clearly illustrate the guide fin assembly 46.

As shown in Fig. 11, the endcap 40 includes inner wall 50, outer wall 52, and a substantially flat base 64. The base and inner wall define a hollowed-out portion 66. However, if desired, the hollowed-out portion 66 may be eliminated without departing from the spirit of the invention.

As shown in Figs. 11-13, the outer wall 52 has a height that is greater than the height of the inner wall 50. The greater height serves a number of purposes. The greater height creates an overhang 68. The overhang 68 helps to guide the tube into the

receiving channel. In addition, the overhang serves a security function, as it makes it more difficult for a customer or other person to gain access to the latching mechanism.

Figs. 14 and 15 show an enlarged view of the right side of Fig. 11, and further show a portion of the tube 20 before and after installation. The tube includes a latching aperture 30 and a latching strip 31 above the latching aperture. As shown in Fig. 14, the guide fins 46, upper wall 54, inner wall 50, and latching edge 64 define a window 70 for receiving the latching strip 31. Fig. 15 shows a cross section of the latching mechanism and tube portion after the tube portion has been fully seated.

Figs. 16A-16C show a series of diagrams illustrating the operation of the central latching member 44 when the tube rim 22 is slid into the receiving channel 41. Fig. 16A shows the tube 20 and endcap 40 prior to installation. In Fig. 16B, the tube rim 22 has been partially slid into the receiving channel 41. Because of the urging of the tube rim 22 against the sloped surface of the central latching member 44, the tube rim 22 has been deflected outwards. This outward deflection of the tube rim 22 allows the tube rim 22 to clear the central latching member 44. In Fig. 16C, the tube rim 22 has been fully seated in the receiving channel 41. It will be seen that the latching aperture 30 is now positioned over the latching member 44, and that the tube rim 22 is no longer deflected outwards.

Figs. 17A-17C show a series of diagrams illustrating the operation of a guide fin assembly 46 when the tube rim 22 is slid into the receiving channel 41. Fig. 17A shows the tube 20 and endcap 40 prior to installation. In Fig. 17B, the tube rim 22 has been partially slid into the receiving channel 41. Because of the urging of the tube rim 22 against the sloped surface of the central latching member 44, illustrated in Fig. 16B and discussed above, the tube rim 22 has been deflected outwards. It will be seen that as the

tube rim 22 continues to be slid into the receiving channel 41, the sloped surfaces of the guide fin assembly 46 will tend to deflect the tube rim back towards the interior of the package. In Fig. 17C, the tube rim 22 has been fully seated in the receiving channel 41 and rests in the relatively narrow region defined by the guide fin assembly 46 and the opposite wall 50.

It will be seen in Figs. 16A-16C and 17A-17C that the sloped surfaces of the latching member 44 and the guide fin assembly 46 are positioned with respect to each other such that the tube rim 22 is first deflected outward by the latching member 46, and then deflected back inward by the guide fin assembly 46.

Figs. 18A and 18B are a pair of bottom views of the latching mechanism illustrating the operation of the latching member 44 and guide fin assemblies 46 and 48. In Fig. 18A, the tube rim 22 has been partially slid into the receiving channel 41. The sloped surface of the latching member 46 causes the tube rim 22 to be deflected downward in Fig. 18A. The sloped surfaces of the guide fin assemblies cause the tube rim 22 to be deflected upward in Fig. 18A. In Fig. 18B, the tube rim 22 has been fully seated into the receiving channel 41. It will be seen that the guide fin assemblies 46 and 48 tend to prevent the tube rim 22 from accidentally disengaging from the latching member 44.

It will be seen in Fig. 18B that the guide fin assemblies 46 and 48 are positioned such that when the tube rim 22 is fully seated in the receiving channel 41, the guide fin assemblies 46 and 48 do not exert pressure on the tube rim 22. This arrangement prevents the tube rim 22 from bowing or otherwise being distorted in the finished package. A distortion in the tube rim 22 may detract from the esthetic appearance of the

finished package. However, if a firmer attachment is desired, the guide fin assemblies 46 and 48 may be shaped such that they press against the tube rim 22 to hold the latching aperture 31 in position over the latching member.

Fig. 19 shows a flowchart of a method 100 according to a further aspect of the invention for packaging a retail item. In step 102, an item to be packaged is loaded into a tube, such as the tube 20 shown in Fig. 1 and discussed in detail above. In step 104, the rim of the tube is slid into the receiving channel of an endcap having a latching member and guide fin assemblies, such as the endcaps shown in Fig. 1. In step 106, the tube rim is seated in the channel with the latching member engaging a latching aperture in the tube rim. The guide fin assemblies prevent the latching aperture from accidentally releasing from the latching member.

While the foregoing description includes details which will enable those skilled in the art to practice the invention, it should be recognized that the description is illustrative in nature and that many modifications and variations thereof will be apparent to those skilled in the art having the benefit of these teachings. It is accordingly intended that the invention herein be defined solely by the claims appended hereto and that the claims be interpreted as broadly as permitted by the prior art.